Aug. 27, 1929. L. C. GREENE 1,726,294

RADIO ACTUATED FIGURE TOY

Filed April 24, 1926

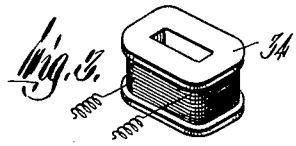

Fig. 3.

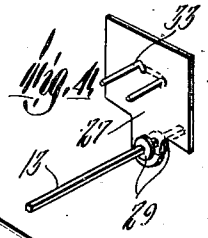

Fig. 4.

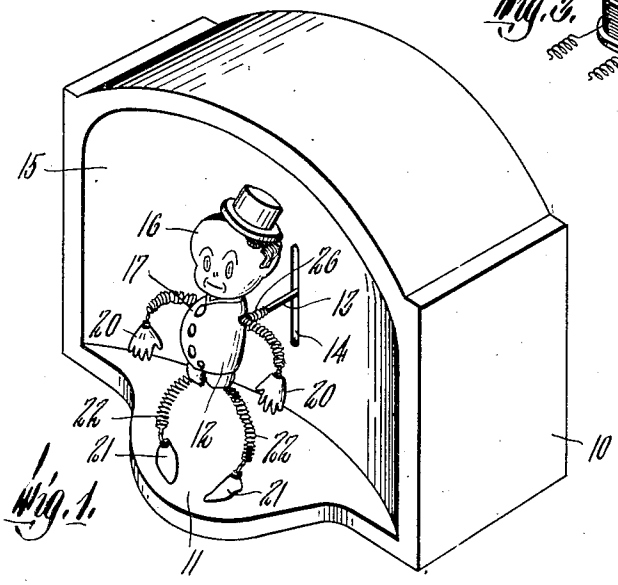

Fig. 1.

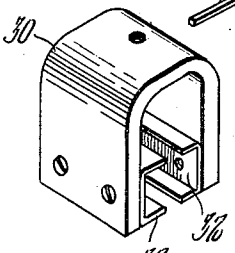

Fig. 5.

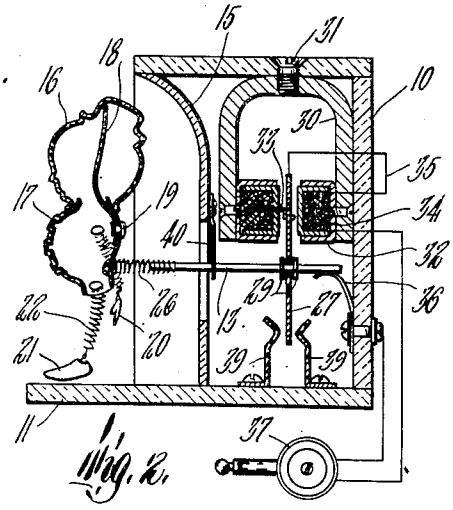

Fig. 2.

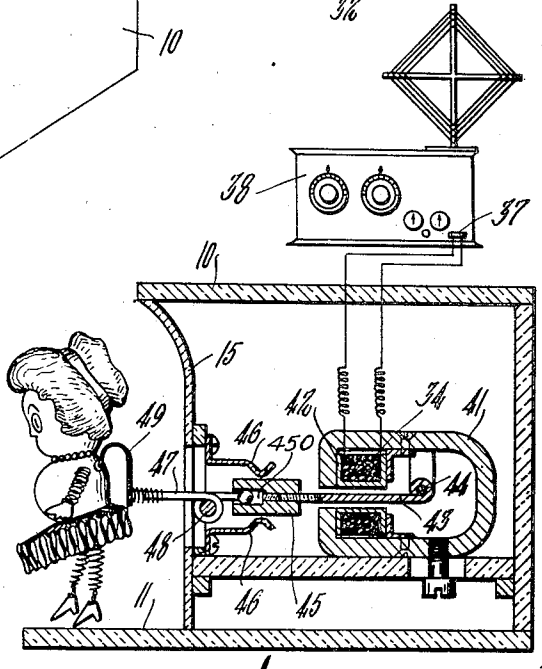

Fig. 6.

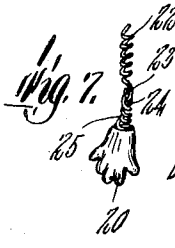

Fig. 7.

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UNITED STATES PATENT OFFICE.

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RADIO ACTUATED FIGURE TOY.

Application filed April 24, 1926. Serial No. 104,266.

This invention relates to electromagnetically vibrated objects and is particularly directed to means for vibrating or agitating such objects in response to pulsating or oscillating electric currents.

More specifically, an object of my invention is to provide a toy figure capable of being automatically agitated in time with music received by radio through a receiving set capable of operating an ordinary "loud speaker." Toy figures or dolls with loosely attached limbs, which can be agitated so as to imitate a clog or similar dance, provide a popular source of amusement and entertainment. Such toys have been constructed to be agitated manually or mechanically in various ways, but so far as I am aware, no means has heretofore been provided for automatically agitating or dancing toy figures in time to music, particularly to music received by radio.

The advantageous features and combinations of my invention will be apparent from the disclosure thereof in the following specification and the drawing, of which:—

Figure 1 represents in perspective the toy figure and the housing for the mechanism.

Figure 2 is a section of the entire device through the middle on the vertical plane.

Figure 3 is a perspective view of an electromagnet winding.

Figure 4 represents the support for the toy figure including the electromagnet armature.

Figure 5 is a perspective view of permanent horseshoe magnet.

Figure 6 is a section of a modified form of the invention, a radio-receiving set and an antenna being conventionally shown as connected therewith.

Figure 7 is a detail of the construction of an arm of a toy figure.

Referring to the drawing in detail, 10 represents a cabinet which may be constructed in any desired ornamental form and is preferably provided with a platform 11 over which a toy figure 12 or a similar object is suspended as by a rod 13 which projects horizontally through a slot 14 in the front wall 15 of the cabinet 10 and is attached to the back of the figure. As indicated in Figure 2, the toy figure should be constructed of light weight materials, the head member 16 being preferably made of thin celluloid or any suitable equivalent, and loosely supported on a torso 17 by an upright wire or spring 18 secured as at 19 to the back of the torso. The torso 17 may also be made of celluloid, but I prefer to use buckram or its equivalent to minimize the noise of the chatter of the head member against the torso during the vibration or agitation of the figure. Suitable hands 20 and feet 21 may be attached to the torso as by helical springs 22. In order to permit freer motion or play of the hands and feet during the vibration of the figure, the connection of these members with the torso may be made as indicated in Figure 7, the end of the helical spring 22 being formed into a loop 23 through which is threaded a loop 24 on the end of a short spring 25 attached directly to the hand or foot.

The figure 12 may be rigidly attached to the bar 13, but I prefer to use therewith a short helical spring 26, one end of which is secured to the torso 17, the other end being slipped over the outer end of the rod 13, which is preferably of square or flattened cross section as shown in Figure 4 to maintain the figure 12 in an upright position. If the spring 26 fits snugly on the rod 13, no additional means is required to hold it in place satisfactorily, but if desired a drop of adhesive may be used for additional security. The support for the toy figure is illustrated in Figure 4 and comprises the rod 13 and an armature 27. The rod 13 and the armature 27 may be rigidly connected as by a soldered joint, or a slightly loose connection such as is indicated in Figure 2 may be used. As there shown, the rod 13 fits loosely in an aperture in the armature 27 and is preferably provided with a pair of flanges 29 which are disposed close to the armature on either side of the aperture. The spacing between the armature 27, the rod 13 and the flanges 29, is greatly exaggerated in Figure 2, and it is to be understood that the play between these parts is preferably very slight. Mounted within the cabinet 10 is an electromagnetic device for agitating or vibrating the toy figure without. This may comprise parts similar to those used in certain well known types of loud speakers. As shown, the device comprises a permanent magnet 30 of the horseshoe type suitably secured as by a screw 31 within the cabinet 10. This magnet may be provided with double pole-pieces 32, between which the armature 27 is rockably supported as by a wire bracket 33 or

other suitable means. Nested between the pole-pieces is a coil 34 of windings which surround a portion of the armature and are spaced therefrom, the flux of this electromagnetic coil 34 thus passing through the armature and polarizing the ends thereof. The magnet coil 34 is preferably electrically connected as by a wire 35 to the armature 27, so that the circuit which includes the magnet coil 34 thus also comprises a portion of the armature 27 and a portion of the rod 13. Lightly touching the latter is a spring 36 which makes with the rod 13 a loose electrical connection in the circuit variable by the vibration of the rod. The magnet coil 34 is preferably connected electrically through the armature 27 and spring 36 to a suitable plug 37 for convenience in connecting the whole device with a radio receiving set conventionally indicated at 38. Pulsating currents of audio frequency set up in the radio receiver in the usual manner are thus led through the magnet coil 34 and cause vibrations in the armature 27 and the rod 13 which constitute the support for the figure. These vibrations are transmitted to the figure, causing it to tremble or shiver in response to sustained tones and to be more violently agitated periodically in response to changes in the amplitude of the waves received such as are caused by the rhythmic sounding of musical instruments in the broadcasting of music by radio waves. Thus the rhythm of the music is transmitted through surges in the plate current to the electromagnet 34, which causes the figure to dance with considerable liveliness in time with the radio music. With the support rockably suspended as shown in Figure 2, the outer end of the rod 13 is given considerable up and down motion by these periodic actuations of the armature causing the figure to be agitated up and down in a manner to shake the limbs with more or less violence according to the strength of the radio reception and to make the head vibrate and tilt on its loose support in a comic and entertaining manner. Stop members 39 are preferably provided at any suitable point to engage some portion of the armature 27 when at its limiting position in either direction and to prevent the armature from coming in actual contact and sticking to either of the pole-pieces 32.

The front wall 15 of the cabinet 10 is preferably made of comparatively thin vibratile material so as to act as a sounding board to reproduce the radio music transmitted by the pulsating current passing through the magnet 34. In order to set up sound-producing vibrations in this wall or diaphragm 15, a light spring 40 of phosphor bronze wire or other suitable material may be rigidly attached to the wall and allowed to rest lightly against the side of the supporting bar 13. This acts satisfactorily to transmit the audio frequency vibrations of the music from the rod to the diaphragm 15 without materially damping the agitation or dancing of the toy figure.

In Figure 6 is indicated a modified form of my device wherein a horseshoe magnet 41 is horizontally mounted within the cabinet and is provided with single pole-pieces 42, the armature 43 being rockably supported as at 44. At the outer end of the armature a plug 45 is mounted having a slot 450, the sides of which engage the end of a supporting rod 47 attached to the toy figure which is rockably mounted as at 48, the short arm of the lever formed by the mounting of the rod 47 being the one engaged in the slot 450 so that motion of the plug 45 up and down in response to actuation by the electromagnet will be magnified in transmission to the toy figure by the lever 47. In order to prevent excessive vibrations of the armature 43 and to prevent physical contact between the armature 43 and either of the pole-pieces of the magnet 41, suitable stops 46 may be provided to limit the motion of the plug 45. As shown in this figure, the toy figure may be attached to the supporting lever 47 as by a member 49 from which the figure may be rockably suspended, this manner of mounting giving more looseness to the connection between the figure and the support.

Having thus described one form of my invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the spirit and scope of my invention as defined by the appended claims.

I claim:

1. In a device of the class described, a toy figure, a support therefor comprising a pivotally mounted armature, means for vibrating said support comprising an electromagnet with windings, an electric circuit connecting said windings with a source of pulsating energy, said circuit including a portion of said support, and a member making a loose electrical connection therewith.

2. In a device of the class described, a toy figure, a support therefor comprising a pivotally mounted armature, a horseshoe magnet, said armature being positioned between the ends of the magnet, stop members positioned to prevent contact of said armature with said magnet, a coil of windings surrounding a portion of said armature and spaced therefrom, a spring contact member, and wiring connecting said coil in series with said armature and said spring member, the armature and spring member forming a loose electrical connection.

3. In a device of the class described, a toy figure, a support for said figure mounted for vibratory motion, an electromagnet having an armature responsive to changes in flux of

audio frequency, means including said armature and actuable by said magnet for vibrating said support and toy, a source of variant electric current, a loose connection associated with said support, and an electric circuit connecting the magnet with the source of current and loose connection, said source of current being capable of causing relatively small tremors in the toy, said loose connection being adjustable to break the circuit momentarily when said tremors exceed a certain amplitude.

4. In a device of the class described, a toy figure, a support therefor comprising a pivotally mounted armature, a pair of magnetic pole pieces of opposite sign, said armature being positioned between said pole pieces, a coil surrounding a portion of said armature and spaced therefrom, a spring contact member, and wiring connecting said coil in series with said armature and spring member, the armature and spring member forming a loose electrical connection.

5. In a device of the class described, a toy figure, a sounding board associated therewith, and means for simultaneously agitating said figure and setting up audible vibrations in said sounding board in response to variant electric currents of audio frequency, said means comprising a vibratile armature mechanically connected to said figure, an electromagnet associated with said armature, means for connecting said electromagnet with a source of variant currents of audio frequency, and a vibration transmitting connection between said armature and said sounding board.

6. A device of the class described comprising in combination, a toy figure, a sounding board, means for simultaneously agitating said figure and vibrating said board in response to variant electric currents of audio frequency, means for converting radiant energy into variant electric currents of audio frequency, and means for operatively connecting said agitating and vibrating means with said converting means.

In testimony whereof I have affixed my signature.

LLOYD C. GREENE.